NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

DAM, DIVERSION

(No. or Ft.)

CODE 348

DEFINITION

A structure built to divert all or part of the water from a waterway or a stream.

PURPOSE

- To divert all or part of the water from a waterway in such a manner that it can be controlled and used beneficially, or
- To divert periodic damaging flows from one watercourse to another watercourse thereby reducing the damage potential of the flows.

CONDITIONS WHERE PRACTICE APPLIES

This standard applies to structures of a permanent nature, constructed of materials having an expected life span consistent with the purpose for which the structure is designed. It does not apply where Diversion (362), Floodwater Diversion (400), Floodwater Retarding Dam (402), or Grade Stabilization Structure (410) would be used.

This practice applies where:

- A diversion dam is needed as an integral part of an irrigation system or a water-spreading system designed to facilitate the conservation use of soil and water resources,
- Diversion of water from an unstable watercourse to a stable watercourse is desirable,
- The water supply available is adequate for the purpose for which it is to be diverted,
- Adverse environmental impacts resulting from the installation of the practice can be overcome.

CRITERIA

The installation and operation of this practice shall comply with all federal, state and local laws, rules, and regulations.

Structural Design. Appurtenant structures shall be designed to withstand all anticipated loads.

Materials. All materials to be used in constructing the diversion dam and appurtenances shall have the strength, durability, and workability required to meet the installation and service conditions of the site.

Earthen portions of diversion dam shall meet all requirements of NRCS Standard 378, Pond.

Hazard. Dams shall be classified as a low, significant or high hazard potential in accordance with NRCS Technical Release 60, Earth Dams and Reservoirs (TR-60), and other references as appropriate for the site-specific conditions.

Hydraulics. When a hazard class has been assigned, the hydraulic capacity of the weir notch of the diversion dam and the stream flow which should be passed through and around the structure without overtopping the structure side walls shall be determined per the following:

  - For low, significant and high hazard potential dams, the minimum flow to be passed through the weir notch without flow around the structure should be the computed bank-full flow of the stream prior to the structure being placed.
  - For low hazard potential dams, the minimum flow to be passed through the weir notch and around the structure without overtopping the structure side walls should be the stream flow having a return period of 25 years.
- For significant and high hazard potential dams, the minimum flow to be passed through the weir notch and around the structure without overtopping must be determined on a site-by-site basis and

must be consistent with the hazard involved if the structure were to fail.

A design that allows for overtopping of the structure, may be allowed only with specific written approval by the State Conservation Engineer.

Gabion Wire Protection. Horizontal faces, where gabion wire is subject to bed load scour during design flows, and vertical wing walls, at risk from snagging with debris, must be protected. Covering the wires with concrete by grouting or gunnite is acceptable.

Excessive concrete must not be used, as it inhibits the flexibility of the gabion structure. The use of forms tend to increase concrete thickness. Filling of voids between rocks after gabion baskets are tied, helps to limit concrete thickness.

Concrete facings shall have vertical score joints not less than ¼ inch wide and at least⅓ the depth of the concrete, placed not more than 6 feet apart, to allow controlled cracking.

While concrete should not be used to make the gabion structure impermeable, the upstream vertical face of the weir wall should be surfaced with concrete to maintain head. Seepage or piping control will normally be provided by graded filter transitions or geotextile membrane or filter material

Environmental Impacts. The impact of a proposed dam on water quality, fish and wildlife habitat, forest, and visual resources shall be evaluated and the techniques and measures necessary to overcome the undesirable effects shall be identified and addressed.

Outlet Works. If part of the flow is to be diverted, the outlet works must provide for positive control of both maximum and minimum flow rates consistent with the purpose for which the diversion is made. The outlet works must provide for safe diversion of all expected flows, considering such hazards as the potential for erosion, cavitation, and reduction in flow capacity due to the buildup of debris and sediment.

Bypass Works. The bypass works must be capable of passing all flows needed to satisfy downstream priorities and all flows in excess of diversion requirements, including expected flood flows. This may require a combination of orifices, weirs, and gates designed to meet the requirements of the site. The bypass works must provide for safe bypass of all expected flows, considering such hazards as the potential for erosion, cavitation, and reduction in flow capacity due to the buildup of debris.

Special-Purpose Works. If debris, bed load materials, or sediments are present under flow conditions subject to diversion, provision shall be made to bypass or remove materials that may be detrimental to the functioning of the outlet works, to other parts of the works, or to areas to which diversion is made. This may require the use of settling basins, debris traps, trash guards, or sluice ways, depending on site conditions.

Vegetation. Disturbed areas, not otherwise covered or protected, shall be vegetated as soon as practicable after construction. If soil or climatic conditions preclude the use of vegetation, and protection is needed, non-vegetative materials, such as mulches, gravel, and rock riprap may be used. As a minimum, seedbed preparation, seeding, fertilizing, and mulching shall comply with instructions in local technical guides. The vegetation shall be maintained and undesirable species controlled.

CONSIDERATIONS

The effects of this practice on water quantity, water quality, and the environment should be considered during the planning process. Effects to be considered are:

- Effects on the water budget, on volume and rate of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge,
- Effects of the use of diverted waters for irrigation,
- Effects on the original watercourse, on the newly constructed watercourse, and on the area where the water is being diverted to and from,
- Effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substances carried by runoff,

- Potential temperature changes in downstream waters resulting from differences in bank shading in different watercourses,
- Potential changes in the amount of soluble substances infiltrating and available for ground water recharge as well as the potential for salt pick-up,
- Potential for introducing new plant or animal species to either the upstream or downstream waters,
- Effects on the natural migration of fish.

PERMITS

All permits are the responsibility of the landowner or operator.

If it is necessary to construct or use any type of diversion on a watercourse, or a conveyance system from a watercourse to a pond for storage, a permit from the State Engineer of New Mexico is required.

Permits may be required from the U.S. Army Corps of Engineers.

DRAWINGS AND SPECIFICATIONS

Drawings and specifications for installing diversion dams must be in keeping with this standard and must describe the requirements for applying the practice to achieve its intended purpose.

Construction must be done according to the requirements of the Occupational Safety and Health Act.

OPERATION AND MAINTENANCE

Provisions shall be made for operation and maintenance requirements and, for larger more complex diversion dams, may include a formal plan.

Typical maintenance may include the removal of accumulated trash and debris from the structure and the repair of gates, screens, and other appurtenances.